



Figure 7. Equivalent Model Parameters for Free (Longitudinal) and Fixed (Transverse) head conditions (from Robinson et al., 2006)

The challenge of the method summarized in Figure 7 is the requirement of two different effective lengths, or restraints, in the longitudinal and transverse directions. Many frame analysis programs allow for a single pile length, but not all allow the addition of very stiff springs to prevent translation in a single direction. SAP does allow for this addition to occur, and a sample equivalent frame is shown in Figure 8. Using the equivalent model based on a properly loaded single pile lateral analysis, much of the behavior of the full nonlinear analysis can be captured in a simple elastic frame analysis approach as proposed by Robinson et al (2006).